

(TABLE 1)

SAMPLE NUMBER	Ag ALLOY MATERIAL FOR FIRST AND SECOND ELECTRODES	COMPOSITION RATIO OF Ag ALLOY (wt%)	ELECTRODE FORMING METHOD AND THICKNESS	PANEL AFTER DIELECTRIC GLASS WAS BAKED (MEASURED WITH COLOUR-DIFFERENCE METER)		COLOR TEMPERATURE OF PANEL (° K)
				a VALUE	b VALUE	
1	Ag-Cu	85-15	SPUTTERING, 3 μ m	-1.2	3.0	8,500
2	Ag-Co	90-10	SPUTTERING, 3 μ m	-1.0	3.5	8,400
3	Ag-Cr	95-5	SPUTTERING, 3 μ m	-2.5	4.5	8,300
4	Ag-Mn	90-10	SPUTTERING, 3 μ m	-0.5	4.5	8,300
5	Ag-Ni	90-10	SPUTTERING, 3 μ m	-3.1	4.0	8,400
6	Ag-Fe	90-10	SPUTTERING, 3 μ m	-3.2	5.0	8,300
7	Ag-Cu-Co	90-5-5	SPUTTERING, 3 μ m	-2.1	1.5	8,950
8	Ag-Cu-Ni	85-10-5	SPUTTERING, 3 μ m	-1.3	3.5	8,500
9	Ag-Cu-Cr	85-10-5	SPUTTERING, 3 μ m	-2.0	0	9,200
10	Ag-Cu-Mn	85-10-5	SPUTTERING, 3 μ m	0	3.3	8,600
11	Ag-Cu-Fe	85-10-5	SPUTTERING, 3 μ m	-2.2	2.1	8,700
12	Ag-Cu-Co-Mn	85-5-5-5	SPUTTERING, 3 μ m	-1.0	0	9,200
13*	Ag	100	SPUTTERING, 3 μ m	-2.1	15	6,500

*SAMPLE NO.13 IS COMPARATIVE EXAMPLE

(TABLE 2)

SAMPLE NUMBER	COMPOSITION OF PHOTOSENSITIVE Ag PASTE USED FOR FIRST AND SECOND ELECTRODES (wt%)			COMPOSITION OF GLASS FRIT MATERIAL (wt%)	PANEL AFTER Ag ELECTRODE AND DIELECTRIC GLASS WERE BAKED		COLOR TEMPERATURE OF PANEL (°K)
	Ag POWDER	PHOTOSENSITIVE ORGANIC MATERIAL	GLASS FRIT MATERIAL		a VALUE	b VALUE	
14	65	23	12	PbO - B ₂ O ₃ - SiO ₂ - CuO 65-15-10-10	-2.2	2.4	8,990
15	65	23	12	PbO - B ₂ O ₃ - SiO ₂ - CoO 65-15-10-10	-3.4	2.0	9,000
16	65	23	12	PbO - B ₂ O ₃ - SiO ₂ - Cr ₂ O ₃ 65-15-10-10	-1.5	2.0	9,010
17	65	23	12	PbO - B ₂ O ₃ - SiO ₂ - MnO 65-15-10-10	-1.6	3.5	8,400
18	65	23	12	PbO - B ₂ O ₃ - SiO ₂ - NiO 65-15-10-10	-3.1	3.0	8,500
19	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - Fe ₂ O ₃ 65-15-10-10	-2.2	2.5	8,670
20	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - CoO 65-15-10-5-5	-3.2	1.5	9,050
21	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - NiO 65-15-10-5-5	-3.3	1.5	9,030
22	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - Cr ₂ O ₃ 65-15-10-5-5	-2.1	1.5	9,000
23	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - MnO 65-15-10-5-5	-1.5	2.0	8,850
24	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - Fe ₂ O ₃ 65-15-10-5-5	-2.0	1.0	9,020
25	60	25	15	PbO - B ₂ O ₃ - SiO ₂ - CuO - CoO - MnO 65-15-10-5-5-5	-1.0	0	9,250
26*	60	25	15	PbO - B ₂ O ₃ - SiO ₂ 65-20-15	-3.2	16	6,300

*SAMPLE NO.26 IS COMPARATIVE EXAMPLE

(TABLE 3)

SAMPLE NUMBER	COMPOSITION OF A ₈ PASTE FOR PRINTING USED FOR FIRST AND SECOND ELECTRODES (wt%)			COMPOSITION OF GLASS FRIT MATERIAL (wt%)	PANEL AFTER A ₈ ELECTRODE AND DIELECTRIC GLASS WERE BAKED		COLOR TEMPERATURE OF PANEL (° K)
	A ₈ POWDER	ORGANIC VEHICLE	GLASS FRIT		a VALUE	b VALUE	
27	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO 60-20-10-10	-2.5	2.5	8,850
28	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CoO 60-20-10-10	-3.5	2.2	8,930
29	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - Cr ₂ O ₃ 60-20-10-10	-1.3	2.1	9,005
30	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - MnO ₂ 60-20-10-10	-1.2	3.6	8,330
31	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - NiO 60-20-10-10	-3.4	3.2	8,400
32	65	25	10	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - Fe ₂ O ₃ 60-20-10-10	-2.5	2.7	8,650
33	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - CoO 60-20-10-5-5	-3.3	1.6	9,080
34	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - Cr ₂ O ₃ 60-20-10-5-5	-3.4	1.7	9,050
35	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - MnO 60-20-10-5-5	-2.5	1.9	9,000
36	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - NiO 60-20-10-5-5	-1.6	2.2	8,930
37	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - Fe ₂ O ₃ 60-20-10-5-5	-2.1	1.1	9,100
38	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ - CuO - CoO - MnO 55-20-10-5-5-5	-1.1	0	9,250
39*	60	25	15	Bi ₂ O ₃ - B ₂ O ₃ - SiO ₂ 60-20-20	-3.0	16.2	6,290

*SAMPLE NO.39 IS COMPARATIVE EXAMPLE

(TABLE 4)

SAMPLE NUMBER	COMPOSITION OF PHOTOSENSITIVE Ag PASTE USED FOR FIRST AND SECOND ELECTRODES (wt%)			COMPOSITION OF GLASS FRIT MATERIAL (wt%)	PANEL AFTER Ag ELECTRODE AND DIELECTRIC GLASS WERE BAKED		COLOR TEMPERATURE OF PANEL (°K)
	Ag POWDER	PHOTOSENSITIVE ORGANIC MATERIAL	GLASS FRIT MATERIAL		a VALUE	b VALUE	
40	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - CuO 30-40-15-15	-2.0	2.3	8,700
41	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - CoO 30-40-15-15	-3.1	2.0	8,950
42	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - Cr ₂ O ₃ 30-40-15-15	-1.4	1.8	9,003
43	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - MnO 30-40-15-15	-1.7	3.2	8,650
44	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - NiO 30-40-15-15	-3.0	2.9	8,550
45	65	23	12	ZnO - B ₂ O ₃ - SiO ₂ - Fe ₂ O ₃ 30-40-15-15	-2.2	2.4	8,690
46	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - CuO - CoO 30-40-10-15-5	-3.2	1.3	9,154
47	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - CuO - Cr ₂ O ₃ 30-40-10-15-5	-3.4	1.4	9,053
48	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - Cr ₂ O ₃ - NiO 30-40-10-10-10	-2.0	1.3	9,130
49	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - Cr ₂ O ₃ - MnO 30-40-10-10-10	-1.5	2.0	8,930
50	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - MnO - NiO 30-40-10-10-10	-2.0	0.8	9,200
51	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ - CoO - MnO - NiO 30-40-10-10-5-5	-1.1	0.1	9,250
52*	70	20	10	ZnO - B ₂ O ₃ - SiO ₂ 30-40-30	-3.3	14	6,350

*SAMPLE NO.52 IS COMPARATIVE EXAMPLE

(TABLE 5)

SAMPLE NUMBER	COMPOSITION OF Ag ALLOY MATERIAL FOR Ag POWDER USED FOR FIRST AND SECOND ELECTRODES	COMPOSITION RATE OF Ag ALLOY (wt%)	TEMPERATURE AT WHICH Ag ELECTRODE IS BAKED	COMPOSITION OF DIELECTRIC GLASS	TEMPERATURE AT WHICH DIELECTRIC MATERIAL IS BAKED	PANEL AFTER DIELECTRIC GLASS WAS BAKED (MEASURED WITH COLOUR-DIFFERENCE METER)		COLOR TEMPERATURE OF PANEL (°K)
						a	b	
61	Ag-Ru	99-1	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.0	2.5	8,750
62	Ag-Re	90-10	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.3	3.0	8,500
63	Ag-Rh	95-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-2.0	3.9	8,300
64	Ag-Os	90-10	590°C	ZnO-B ₂ O ₃ -SiO ₂ -K ₂ O	590°C	-1.5	3.8	8,350
65	Ag-Ir	90-10	590°C	Bi ₂ O ₃ -ZnO-SiO ₂	590°C	-2.6	3.4	8,410
66*	Ag-Pd	90-10	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-3.0	4.0	8,300
67	Ag-Ru-Re	90-5-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.1	0.5	9,030
68	Ag-Ru-Rh	85-10-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.0	1.5	8,950
69	Ag-Ru-Os	85-10-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.0	0	9,200
70	Ag-Ru-Ir	85-10-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-1.2	2.0	8,800
71	Ag-Ru-Pd	85-10-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-2.0	1.8	8,860
72	Ag-Ru-Os-Re	85-5-5-5	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	1.0	0	9,200
73*	Ag	100	590°C	PbO-B ₂ O ₃ -SiO ₂ -CaO	590°C	-2.1	15	6,500

*SAMPLE NO.73 IS COMPARATIVE EXAMPLE,
SAMPLE NO.66 IS REFERENCE EXAMPLE

(TABLE 6)

SAMPLE NUMBER	COMPOSITION OF PHOTOSENSITIVE Ag PASTE USED IN FIRST AND SECOND ELECTRODES(wt%)			COMPOSITION OF GLASS FRIT MATERIAL(wt%)	PANEL AFTER Ag ELECTRODE AND DIELECTRIC GLASS WERE BAKED		COLOR TEMPERATURE OF PANEL,° K)
	Ag POWDER	PHOTOSENSITIVE ORGANIC MATERIAL	GLASS FRIT MATERIAL		a VALUE	b VALUE	
74	65	23	12	PbO-B ₂ O ₃ -SiO ₂ -RuO ₂ 75-15-5-5	-2.0	2.2	9,000
75	65	23	12	PbO-B ₂ O ₃ -SiO ₂ -ReO ₂ 75-15-5-5	-3.0	1.9	9,020
76	65	23	12	PbO-B ₂ O ₃ -SiO ₂ -IrO ₂ 75-15-5-5	-1.5	1.8	9,030
77	65	23	12	PbO-B ₂ O ₃ -SiO ₂ -RhO 75-15-5-5	-1.6	3.0	8,450
78	65	23	12	PbO-B ₂ O ₃ -SiO ₂ -OsO ₂ 75-15-5-5	-3.0	2.5	8,650
79	60	25	15	PbO-B ₂ O ₃ -SiO ₂ -PdO 75-15-5-5	-2.2	2.4	8,700
80	60	25	15	PbO-B ₂ O ₃ -SiO ₂ -RuO ₂ -ReO ₂ 75-10-5-5-5	-3.1	1.3	9,100
81	60	25	15	Bi ₂ O ₃ -B ₂ O ₃ -SiO ₂ -RuO ₂ 75-15-5-5	-3.2	1.5	9,030
82	60	25	15	Bi ₂ O ₃ -B ₂ O ₃ -SiO ₂ -RuO ₂ -ReO ₂ 75-10-5-5-5	-2.1	1.4	9,040
83	60	25	15	Bi ₂ O ₃ -B ₂ O ₃ -SiO ₂ -RuO ₂ -OsO ₂ 75-10-5-5-5	-1.5	2.0	8,850
84	60	25	15	P ₂ O ₅ -B ₂ O ₃ -SiO ₂ -ReO ₂ -PdO 75-10-5-5-5	-2.0	1.0	9,100
85	60	25	15	P ₂ O ₅ -B ₂ O ₃ -SiO ₂ -RuO ₂ -ReO ₂ 75-10-5-5-5	-1.0	0	9,250
86*	60	25	15	PbO-B ₂ O ₃ -SiO ₂ 65-20-15	-3.2	16	6,300

*SAMPLE NO.86 IS COMPARATIVE EXAMPLE

(TABLE 7)

SAMPLE NUMBER	COATING MATERIAL FOR Ag PARTICLE (TYPE/PARTICLE DIAMETER)	COATING METHOD	FORM OF PASTE	ELECTRODE FORMING METHOD	TEMPERATURE AT WHICH DIELECTRIC MATERIAL IS BAKED	PANEL AFTER DIELECTRIC GLASS WAS BAKED		COLOR TEMPERATURE OF PANEL, °K
						a VALUE	b VALUE	
91	Pd 0.2 μ m	PLATING METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.3	1.5	9020
92	Cu 0.1 μ m	PLATING METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-2.2	2.1	8950
93	Ni 0.1 μ m	PLATING METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-2.0	1.8	9010
94	Co 0.1 μ m	PLATING METHOD	PRINT PASTE	SCREEN-PRINTING METHOD	590°C	-2.2	1.2	9035
95	Cr 0.1 μ m	PLATING METHOD	PRINT PASTE	SCREEN-PRINTING METHOD	590°C	-2.0	1.3	9030
96	Rh 0.5 μ m	PLATING METHOD	PRINT PASTE	SCREEN-PRINTING METHOD	590°C	-1.2	1.1	9050
97	Ir 0.6 μ m	PLATING METHOD	PRINT PASTE	SCREEN-PRINTING METHOD	590°C	-1.0	0.5	9500
98	Ru 0.3 μ m	PLATING METHOD	PRINT PASTE	SCREEN-PRINTING METHOD	590°C	-1.2	0.7	9450
99	Pd 1.0 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.2	1.0	9100
100	Cu 1.0 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-2.0	1.8	9015
101	Ni 0.5 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.5	1.2	9040
102	Rh 0.3 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.0	0.8	9320

(TABLE 8)

SAMPLE NUMBER	COATING MATERIAL FOR Ag PARTICLE (TYPE/PARTICLE DIAMETER)	COATING METHOD	FORM OF PASTE	ELECTRODE FORMING METHOD	TEMPERATURE AT WHICH DIELECTRIC MATERIALS BAKED	PANEL AFTER DIELECTRIC GLASS WAS BAKED		COLOR TEMPERATURE OF PANEL, °K
						a VALUE	b VALUE	
103	Al ₂ O ₃ 0.1 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.2	1.0	9105
104	NiO 0.1 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-2.1	1.9	9002
105	ZrO ₂ 0.1 μ m	SOL-GEL METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.1	0.8	9310
106	CoO 0.1 μ m	MECHANOFUSION METHOD	PRINT PASTE	PRINTING METHOD	590°C	-2.2	1.4	9018
107	Fe ₂ O ₃ 0.2 μ m	MECHANOFUSION METHOD	PRINT PASTE	PRINTING METHOD	590°C	-2.0	1.5	9020
108	ZnO 0.2 μ m	SOL-GEL METHOD	PRINT PASTE	PRINTING METHOD	590°C	-1.0	0.5	9510
109	In ₂ O ₃ 0.5 μ m	SOL-GEL METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-0.8	0.3	9620
110	CuO 0.5 μ m	SOL-GEL METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-2.1	1.3	9032
111	TiO ₂ 0.2 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.5	1.2	9045
112	Pt ₆ O ₁₁ 0.5 μ m	MECHANOFUSION METHOD	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-1.0	0.2	9720
113*	NONE	NONE	PHOTO PASTE	PHOTOLITHOGRAPHY METHOD	590°C	-10.5	10.3	6300

*SAMPLE NO.113 IS COMPARATIVE EXAMPLE

(TABLE 9)

SAMPLE NUMBER	PRE-BAKING OF SUBSTRATE		ETCHING		MECHANICAL POLISHING	PANEL AFTER DIELECTRIC GLASS WAS BAKED		COLOR TEMPERATURE OF PANEL (°K)
	PERFORMED OR NOT	TEMPERATURE	PERFORMED OR NOT	DEPTH		b VALUE	SCATTER	
121	NOT PERFORMED	—	PERFORMED	5 μ m	NOT PERFORMED	3.0	± 2.0	9,000
122	NOT PERFORMED	—	PERFORMED	5 μ m	PERFORMED	3.1	± 0.5	9,010
123	NOT PERFORMED	—	PERFORMED	10 μ m	PERFORMED	1.0	± 0.5	9,010
124	NOT PERFORMED	—	PERFORMED	15 μ m	PERFORMED	0.8	± 0.5	9,010
125	NOT PERFORMED	—	PERFORMED	20 μ m	PERFORMED	0.8	± 0.5	9,010
126	PERFORMED	500°C	NOT PERFORMED	—	NOT PERFORMED	3.8	± 0.6	8,900
127	PERFORMED	600°C	NOT PERFORMED	—	NOT PERFORMED	2.5	± 0.7	9,600
128	PERFORMED	400°C	NOT PERFORMED	—	NOT PERFORMED	15.0	± 0.5	6,900
129	NOT PERFORMED	—	NOT PERFORMED	—	NOT PERFORMED	14.0	± 0.7	6,900
130	NOT PERFORMED	—	NOT PERFORMED	—	PERFORMED	15.0	± 0.8	6,500
131	NOT PERFORMED	—	PERFORMED	1 μ m	NOT PERFORMED	16.0	± 0.6	6,300

*SAMPLES NO.128 TO 131 ARE COMPARATIVE EXAMPLES